

### REMARKS

Claims 1-20 are pending in this application. Applicants affirm the election to prosecute the Group II claims (claims 7-20). Accordingly, claims 1-6 have been cancelled.

Applicants hereby submit an amendment regarding the federal sponsor of the present application to comply with 37 C.F.R. 1.77. No new matter has been added.

Claims 8-12, 14-16, and 19 stand rejected under 35 U.S.C. § 112, second paragraph. The amendments to claims 8-12, 14-16, and 19 overcome these rejections.

Claim 8 has been amended to replace the word "microparticles" with the word "particles" to provide sufficient antecedent basis for this limitation in the claim.

Claims 8-12, 14-16, and 19 have been amended to conform to the Examiner's suggestions made in the Office Action in paragraph 4. Applicants wish to extend their gratitude to the Examiner for pointing out these inadvertent typographical errors. Although not specifically mentioned by the Examiner, claim 17 has also been amended to depend on claim 16.

Claims 7, 9-11, 13, 14, 18, and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Serpico et al. (U.S. Patent No. 5,677,074). The Examiner asserts that the process taught by Serpico for making and applying a catalyst ink to a substrate includes the same elements as the process described by the applicants. The Examiner's assertion, however, is incorrect.

The catalyst ink claimed by the applicants includes particles of a fluorocarbon polymer with a particle size of about 1 to about 4 microns. The use of particles within this definite size range allows for control of the aggregate structure of the hydrophobic element in the cathode ink composition (see Specification, page 5, lines 18-19). In contrast, Serpico teaches a broad range of particle sizes spanning four orders of magnitude, from 0.05  $\mu$ m to 500  $\mu$ m (col. 2, lines 42-43), and preferably from 50  $\mu$ m to 500  $\mu$ m (col. 2, line 58). Serpico does not recognize the importance of controlling particle size or the importance of small particle size in the range of 1-4

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microns, in particular, for making a catalyst ink. Moreover, claims 13, 18, and 20 require applying the catalyst ink to a substrate at room temperature, whereas Serpico applies the ink at elevated temperature (see, for example, col. 5, lines 51-60). Accordingly, Serpico does not anticipate the claims, and the 35 U.S.C. § 102(b) rejection should be withdrawn. Regarding the 35 U.S.C. § 103(a) rejections against dependent claims 8, 10, 12, 15-17, and 19, these claims would not have been obvious over the cited references for the same reasons as given above, and the 35 U.S.C. § 103(a) rejections should be withdrawn.


Attached is a marked-up version of the changes being made by the current amendment.

Applicant asks that all claims be allowed. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date:

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**Version with markings to show changes made**

In the specification:

Paragraph has been inserted beginning at page 1, line 3 as follows:

-- STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR  
DEVELOPMENT

This work was sponsored by the National Aeronautical and Space Administration  
(NASA). --

In the claims:

Please cancel claims 1-6.

Claims 8-12, 14-17, and 19 have been amended as follows:

8. (Amended) The process of claim [5]7, wherein the [micro]particles have a surface area of about 5 to about 10 m<sup>2</sup>/g.

9. (Amended) The process of claim [5]7, wherein the catalytic material comprises Pt.

10. (Amended) The process of claim [5]7, wherein the fluorocarbon polymer is selected from the group consisting of polytetrafluoroethylene polymers and fluorinated ethylene-propylene polymers.

11. (Amended) The process of claim [1]7, wherein the catalyst ink further comprises an ionomer.

12. (Amended) The process of claim [9]11, wherein the ionomer comprises a liquid copolymer of tetrafluoroethylene and perfluorvinylethersulfonic acid.

14. (Amended) The process of claim [11]13, wherein the substrate is a membrane.

15. (Amended) The process of claim [12]14, further comprising roughening the surface of the membrane prior to applying the catalyst ink.

16. (Amended) The process of claim [13]15, wherein the surface is roughened by contacting the membrane with an abrasive selected from the group consisting of silicon nitride, boron nitride, silicon carbide, silica and boron carbide.

17. (Amended) The process of claim [14]16, wherein the abrasive has a grit size of about 300 to about 400.

19. (Amended) The process of claim [16]18, further comprising roughening the surface of the membrane prior to applying the catalyst ink.